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PATENT COOPERATION TREATY

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PCT

INTERNATIONAL PRELIMINARY EXAMINATION  
(PCT Article 36 and Rule 70)

REC'D 16 AUG 2004

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Applicant's or agent's file reference P-DELPHI-083/WO	<b>FOR FURTHER ACTION</b> <small>See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)</small>	
International application No. PCT/EP 03/50281	International filing date (day/month/year) 01.07.2003	Priority date (day/month/year) 02.07.2002
International Patent Classification (IPC) or both national classification and IPC F25B9/00		
Applicant DELPHI TECHNOLOGIES, INC. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand 09.01.2004	Date of completion of this report 13.08.2004
Name and mailing address of the International preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer McLaughlin, D Telephone No. +49 89 2399-2762



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP 03/50281

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-8 as originally filed

**Claims, Numbers**

1-10 as originally filed

**Drawings, Sheets**

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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EXAMINATION REPORT**

International application No. **PCT/EP 03/50281**

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	4-8
	No: Claims	1-3, 9-10
Inventive step (IS)	Yes: Claims	
	No: Claims	4-8
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Section V**

- 1) Document US-A-6 230 506 (document D1) is considered to represent the closest prior art. Document D1 reveals (see column 5, line 33 to column 9, line 20 and figures 1 to 8) an air conditioning system in particular an air conditioning system having carbon dioxide as a refrigerant particular for use in a motor vehicle, said air conditioning system comprising a compressor (10), a gas cooler (20), an expansion valve (50) and an evaporator (30) arranged in series and forming a closed circuit for said refrigerant; said compressor (10) having a compressor capacity control element (60) and said air conditioning system further comprising a controller (60) for controlling said compressor capacity control element and said expansion valve (50) so as to regulate an expansion valve inlet pressure; said controller regulating said expansion valve inlet pressure by
  - controlling said compressor capacity control element (which is just the control (60)) so as to align evaporator air off temperature (65) with a set point;
  - monitoring expansion valve inlet temperature (61);
  - determining a required expansion valve inlet pressure corresponding to said monitored expansion valve inlet temperature by means of a control algorithm (see column 6, lines 55 to 61);
  - adjusting said expansion valve and said compressor capacity control element together along an iso-capacity curve to said required expansion valve inlet pressure (see, for example figure 5 and description thereof).

Document D1 reveals all the features of claim 1 and claim 1 is not new (Article 33(2) PCT).

It should be noted that document DE-A-100 53 203 (document D2) also reveals all the features of claim 1 - see column 18, line 48 to column 19, line 35 and figures 6 and 18.

- 2) Documents D1 and D2 reveal all the features of claims 2 and 3 and document D1 reveals the features of claim 9 whereas document D2 reveals all the features of claim 10.

Hence, claims 2, 3, 9 and 10 are not new (Article 33(2) PCT).

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EXAMINATION REPORT - SEPARATE SHEET**

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3) Claims 4 to 7 relate to the estimation of various cycle parameters on the basis of other parameters. It is considered that claims 4 to 7 come within the normal remit of the skilled man, for example, the features of claim 4 are known from document US 2001/0003904 A1 (document D3), and do not contain any inventive material when combined with any claim to which they refer.

Hence, claims 4 to 7 do not meet the requirements of Article 33(3) PCT as they do not involve an inventive step.

4) The features of claim 8 have been used for the same purpose in a similar apparatus - see R.P. McEnaney and P.S. Hmjak "Control strategies for transcritical R744 Systems" SAE Paper 2001-01-1272, 6 March 2000 (document D4). Hence, it would be obvious for the skilled man, when the same effect is to be attained, to use the teaching of document D4 and apply it to document D1 and in this manner to arrive at the subject-matter of claim 8 without an inventive step (Article 33(3) PCT).

5) The industrial applicability of the invention is obvious.